

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHI-WEN LIU
and YING-LANG WANG

Appeal 2006-2759
Application 10/043,860
Technology Center 1700



Decided: September 28, 2006

Before GARRIS, PAK, and WARREN, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the decision of the Examiner finally rejecting claims 1, 3, 4, 6, 9 through 13, 15 through 19 and 21 and refusing to allow claim 5 as amended subsequent to the final rejection, which are all of the claims in the application.

Claim 1 illustrates Appellants' invention of a method for pre-etching a semiconductor wafer, and is representative of the claims on appeal:

1. A method for pre-etching a semiconductor wafer comprising tungsten oxide prior to a chemical mechanical polishing (CMP) process to achieve a uniform tungsten polishing rate comprising the steps of:

providing a wafer process surface having a layer of tungsten oxide overlaying tungsten to be chemically mechanically polished;

removing the layer of tungsten oxide according to an etching process selected from the group consisting of dry etching with a fluorocarbon etching chemistry and wet etching with an aqueous basic solution;

cleaning the semiconductor wafer to include the wafer process surface according to a wet cleaning process; and,

chemically mechanically polishing the wafer process surface according to a CMP process comprising applying at least an abrasive slurry to the wafer process surface.

The references relied on by the Examiner are:

Manos	US 5,672,212	Sep. 30, 1997
Torii	US 2002/0068451 A1	Jun. 6, 2002
Miller	US 6,464,568 B2	Oct. 15, 2002

The Examiner has rejected appealed claims 1, 5, 6, 10 through 12 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Torii and Miller (Answer 3-5) and appealed claims 3, 4, 9, 13, and 15 through 19 under 35 U.S.C. § 103(a) as being unpatentable over Torii and Miller as applied to claim 1 above, further in view of Manos (*id.* 5-6).

Appellants state that the appealed claims “do not stand or fall together” and group the claims as grouped in each of the grounds of rejection (Br. 5). Thus, we decide this appeal based on appealed claims 1 and 3 as representative of the grounds of rejection and Appellants’ grouping of claims. 37 C.F.R. § 1.192(c)(7) (2003); *see also* 37 C.F.R. § 41.37(c)(1)(vii) (September 2004).

We affirm.

We refer to the Answer and to the Brief for a complete exposition of the positions advanced by the Examiner and Appellants.

OPINION

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the Examiner that, *prima facie*, the claimed method for pre-etching a semiconductor wafer encompassed by appealed claims 1 and 3 would have been obvious over the combined teachings of Torii and Miller (claim 1) and of Torii, Miller, and Manos (claim 3) to one of ordinary skill in this art at the time the claimed invention was made. Accordingly, since a *prima facie* case of obviousness has been established by the Examiner, we again evaluate all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of Appellants' arguments in the Brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

We agree with the Examiner's findings of fact from the references, conclusions of law based on this substantial evidence, and response to Appellants' arguments set forth in the Answer, to which we add the following for emphasis.

Appellants contend that Torii would have taught away from the claimed invention by claiming "a two-step polishing method" (Br. 6-7). We disagree. This is because we find that the "first" and "second" polishing steps of Torii (Torii cols. 2-3, ¶¶ 0027 and 0028) correspond to the claimed steps of "wet etching with a aqueous basic solution" and of "chemically

mechanically polishing . . . comprising applying at least an abrasive slurry,” respectively, of claim 1.

Appellants argue that the ground of rejection must address each of the members of a Markush group, pointing out that Torii does not disclose the method of “dry etching with a fluorocarbon chemistry” which is the first method in the Markush group specified in the claimed second step (Br. 7). We know of no authority which requires that the Examiner must find that all members of a Markush group would have been obvious over the prior art, including *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958), and *In re Scott*, 323 F.2d 1016, 139 USPQ 297 (CCPA 1963) cited by Appellants (Br. 8). All that is required is that the Examiner establish that the claimed embodiments represented by at least one member of a Markush group would have been obvious over the prior art in order to make out a prima facie case of obviousness.

With respect to Appellants’ contentions that “Torii does not disclose a pH for the alkali solution” (Br. 8-9; original emphasis deleted), we find that the reference would have disclosed that the first polishing step can be “prepared to have pH 10 to 12 using ammonia and contain . . . silica as an abrasive” (Torii cols. 2-3, ¶ 0027).

We cannot subscribe to Appellants’ position that Miller teaches away from the claimed method encompassed by claim 1 simply because the method taught therein employs different steps than claimed. *See generally*, *In re Kahn*, 441 F.3d 977, 985-89, 78 USPQ2d 1329, 1334-38 (Fed. Cir. 2006) (“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the

path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” (quoting *In re Gurley*, 27 F.3d 551, 553 [31 USPQ2d 1130, 1131] (Fed. Cir. 1994))); *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1145-46 (Fed. Cir. 2004) (prior art “disclosure does not criticize, discredit, or otherwise discourage the solution claimed”). Indeed, we find no teaching in Miller which specifically criticizes the teachings of Torii. *See generally, In re Young*, 927 F.2d 588, 591-92, 18 USPQ2d 1089, 1091-92 (Fed. Cir. 1991).

We further disagree with Appellants’ position that Torii and Miller are not combinable because Torii does not specifically teach the application of the method disclosed therein to metals other than tungsten, and thus Miller’s method for copper would not be expected to be successful in Torii’s method for tungsten (Br. 12-13). There is no requirement that the method of a reference must be capable of being incorporated into the method of another reference before it would have been combined by one of ordinary skill in this art. *See In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881-82 (CCPA 1981)(“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.”). As the Examiner points out in explaining the rejection, one of ordinary skill in this art would have found in Miller the teaching to remove the material applied to the wafer in one step

by rinsing the wafer before proceeding to the next and would have applied that teaching to the process of Torii.

Turning now to the combined teachings of Torii, Miller and Manos, we have considered Appellants' arguments (Br. 14-17) with respect to the combination of Torii and Miller above. We determine that the plain language of claim 3 requires that the wet etching step include agitating the wafer surface. Contrary to Appellants' arguments, Torii would have disclosed that the tungsten containing wafer is "immersed in an alkali aqueous solution . . . for about 10 minutes" (Torii col. 3, ¶ 0033), and we determine that one of ordinary skill in this art would have recognized from Manos that agitating means can be added to that solution to increase the efficiency of that step.

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teachings of Torii and Miller and of Torii, Miller and Manos with Appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1, 3 through 6, 9 through 13, 15 through 19 and 21 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The Examiner's decision is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2005).

AFFIRMED

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